

RECEIVED
CENTRAL FAX CENTER
SEP 07 2006

AMENDMENTS TO THE CLAIMS:

Please replace the claims with the claims provided in the listing below wherein status, amendments, additions and cancellations are indicated.

1. (Cancelled)

2. (Currently Amended) A torque transmission coupling comprising:

input-output rotary members rotatably supported to perform input-output transmission of torque;

5 a frictional engagement section provided between the input-output rotary members to perform torque transmission between the input-output rotary members by enforcing frictional engagement;

10 a compression member set that comprises a pair of members capable of performing relative rotation and that generates thrust through the relative rotation between the members to thereby cause the frictional engagement section to perform the frictional engagement; and

 a rotary actuator that causes both of the members of the compression member set to perform engagement-rotational driving whereby to cause the relative rotation;

15 the compression member set is a compression gear set that comprises a pair of gears provided as the pair of members, an outer gear engaged with the gears and an outer gear support for supporting the outer gear, and that converts an input

F9196 edu 02 (PC14).wpd

F-8196

Identificr: Masao TERAOKA

generated by rotational driving into a compression force in the direction along a rotation axis to thereby cause the frictional engagement section to enforce the frictional engagement, wherein gear ratios or engagement radii between the pair of individual gears and the outer gear are different from each other; any one of the pair of gears, the outer gear, and the outer gear support is non-rotatably supported; any other one thereof is rotationally driven; and the other thereof performs the relative rotation;

the rotary actuator performs the rotational driving; and

the pair of gears comprise a proximal gear and a distal gear;

the distal gear being disposed further from the rotary actuator than the proximal gear; and

the proximal gear being disposed radially inward of said having an inner radii that is smaller than the inner radii of the outer gear;

wherein the coupling further comprises:

an exterior housing;

a pinion shaft rotatably connected with the input rotary member;

the pinion shaft being rotatably supported within the housing by a pair of axially spaced bearings; and

center axes of each bearing and said pinion shaft being mutually angularly offset.

F-8196

Identifier: Masao TERAOKA

3. (Withdrawn) A torque transmission coupling according to claim 2,
wherein:

the rotary actuator performs the rotational driving of the planetary carrier;

the one of the pair of gears is non-rotatably supported;

5 a cam mechanism is interposed between the pair of gears; and

the gear ratios between the pair of individual gears and the planetary gear
are different from each other.

4. (Previously Presented) A torque transmission coupling according to
claim 2, wherein:

10 the rotary actuator performs the rotational driving of the one of the pair of
gears;

the outer gear support is non-rotatably supported;

a cam mechanism is interposed between the pair of gears; and

15 the gear ratios or the engagement radii between the pair of individual gears
and the outer gear are different from each other.

5. (Withdrawn) A torque transmission coupling according to claim 2,
wherein:

20 the rotary actuator performs the rotational driving of the one of the pair of
gears;

F-8196

Identifier: Masao TERAOKA

the other of the pair of gears is non-rotatably supported;

a cam mechanism is interposed between the other of the pair of gears and the planetary carrier; and

the engagement radii between the pair of individual gears and the planetary gear are different from each other.

6. (Previously Presented) A torque transmission coupling according to claim 2, wherein:

the outer gear support is supported to be capable of performing constant-angle relative rotation;

an urging member to be interposed between the outer gear support and a support body side is provided to interfere to rotation with an urging force for the outer gear support that rotates in the same direction at a time of the rotational driving by the rotary actuator;

the torque transmission coupling further comprises displacement detection means that detects a displacement amount when the outer gear support performs rotational displacement in resistance with the urging member; and

an engagement force of the frictional engagement section is obtained in accordance with the displacement amount detected

the outer gear support comprises:

F-8196

Identifier: Masao TERAOKA

first and second radially extending plates disposed on axially
opposing ends of the outer gear;

a pin connecting the plates and supporting the outer gear;

one of the plates including a cutout, the cutout having a first end
5 disposed between an inner and outer radius of the plate and the cutout
extending tangentially from the first end; and

the urging member being a biasing member that engages the plate
cutout.

7. (Withdrawn) A torque transmission coupling according to claim 3,
10 wherein:

the planetary carrier is supported to be capable of performing
constant-angle relative rotation;

an urging member to be interposed between the planetary carrier and a
support body side is provided to interfere to rotation with an urging force for the
15 planetary carrier that rotates in the same direction at a time of the rotational
driving by the rotary actuator;

the torque transmission coupling further comprises displacement detection
means that detects a displacement amount when the planetary carrier performs
rotational displacement in resistance with the urging member; and

F-8196

Identifier: Masao TERAOKA

an engagement force of the frictional engagement section is obtained in accordance with the displacement amount detected.

8. (Previously Presented) A torque transmission coupling according to claim 4, wherein:

5 the outer gear support is supported to be capable of performing constant-angle relative rotation;

an urging member to be interposed between the outer gear support and a support body side is provided to interfere to rotation with an urging force for the outer gear support that rotates in the same direction at a time of the rotational driving by the rotary actuator;

10

the torque transmission coupling further comprises displacement detection means that detects a displacement amount when the outer gear support performs rotational displacement in resistance with the urging member;

an engagement force of the frictional engagement section is obtained in accordance with the displacement amount detected; and

15

the outer gear support comprises:

first and second radially extending plates disposed on axially opposing ends of the outer gear;

a pin connecting the plates and supporting the outer gear;

F-8196

Identifier: Masao TERAOKA

one of the plates including a cutout, the cutout having a first end disposed between an inner and outer radius of the plate and the cutout extending tangentially from the first end; and

the urging member being a biasing member that engages the plate cutout.

5

9. (Withdrawn) A torque transmission coupling according to claim 5, wherein:

the planetary carrier is supported to be capable of performing constant-angle relative rotation;

10

an urging member to be interposed between the planetary carrier and a support body side is provided to interfere to rotation with an urging force for the planetary carrier that rotates in the same direction at a time of the rotational driving by the rotary actuator;

15

the torque transmission coupling further comprises displacement detection means that detects a displacement amount when the planetary carrier performs rotational displacement in resistance with the urging member; and

an engagement force of the frictional engagement section is obtained in accordance with the displacement amount detected.

F-8196

Identifier: Masao TERAOKA

10. (Currently Amended) A torque transmission coupling according to claim[[1]]2, wherein:

the one of the pair of members is supported in the support body side in the direction along the rotation axis; and

5 the thrust is exerted on the other member as a reaction force with respect to the support body side whereby to cause the frictional engagement to be performed.

11. (Previously Presented) A torque transmission coupling according to claim 10, wherein:

10 the compression member set comprises a pair of gears, an outer gear engaged with the gears and an outer gear support, converts an input generated by rotational driving into a compression force in the direction along the rotation axis to thereby cause the frictional engagement section to enforce the frictional engagement, wherein any one of the pair of gears, the outer gear, and the outer
15 gear support is non-rotatably supported; and any other one thereof is rotationally driven; and the other thereof performs the relative rotation; and

gear ratios or engagement radii between the pair of individual gears and the outer gear are different from each other.

F-8196

Identifier: Masao TERAOKA

12. (Withdrawn) A torque transmission coupling according to claim 11,
wherein:

the rotary actuator performs the rotational driving of the planetary carrier;
the one of the pair of gears is supported in the support body side to be
5 non-rotatable and in the direction along the rotation axis;
a cam mechanism is interposed between the pair of gears; and
the gear ratios between the pair of individual gears and the planetary gear
are different from each other.

13. (Previously Presented) A torque transmission coupling according to
10 claim 11, wherein:

the rotary actuator performs the rotational driving of the one of the pair of
gears;
the outer gear support is non-rotatably supported in the support body side;
a cam mechanism is interposed between the pair of gears; and
15 the one of the pair of gears is supported in the support body side in the
direction along the rotation axis; and
the gear ratios or the engagement radii between the pair of individual gears
and the outer gear are different from each other.

F-8196

Identifier: Masao TERAOKA

14. (Withdrawn) A torque transmission coupling according to claim 11,
wherein:

the rotary actuator performs the rotational driving of the one of the pair of
gears;

5 the other of the pair of gears is non-rotatably supported in the support body
side;

a cam mechanism is interposed between the support body side and the
planetary carrier; and

10 the engagement radii between the pair of individual gears and the planetary
gear are different from each other.

15. (Cancelled)

16. (Original) A torque transmission coupling according to claim 2,
wherein the rotary actuator and the frictional engagement section are disposed with
rotation axes thereof being aligned with each other.

15 17. (Withdrawn) A torque transmission coupling according to claim 3,
wherein the rotary actuator and the frictional engagement section are disposed with
rotation axes thereof being aligned with each other.

F-8196

Identifier: Masao TERAOKA

18. (Original) A torque transmission coupling according to claim 4,
wherein the rotary actuator and the frictional engagement section are disposed with
rotation axes thereof being aligned with each other.

5 19. (Withdrawn) A torque transmission coupling according to claim 5,
whercin the rotary actuator and the frictional engagement section arc disposed with
rotation axes thereof being aligned with each other.

20. (Original) A torque transmission coupling according to claim 6,
wherein the rotary actuator and the frictional engagement section are disposed with
rotation axes thereof being aligned with each other.

10 21. (Withdrawn) A torque transmission coupling according to claim 7,
wherein the rotary actuator and the frictional engagement section are disposed with
rotation axes thereof being aligned with each other.

15 22. (Original) A torque transmission coupling according to claim 8,
wherein the rotary actuator and the frictional engagement section are disposed with
rotation axes thereof being aligned with each other.

F-8196

Identifier: Masao TERAOKA

23. (Withdrawn) A torque transmission coupling according to claim 9, wherein the rotary actuator and the frictional engagement section are disposed with rotation axes thereof being aligned with each other.

5 24. (Original) A torque transmission coupling according to claim 15, wherein a press member is provided between the frictional engagement section and the compression member set, receives the thrust from the compression member set to cause the frictional engagement.

25. (Withdrawn-Currently Amended) A torque transmission coupling according to claim[[1]]2, wherein:

10 the compression member set is a compression gear set comprising a pair of gears provided as the pair of members;

the rotary actuator comprises a rotational driving shaft tiltedly disposed with respect to the direction along the rotation axis of the compression gear set, and a pair of driving gears fixed to the rotational driving shaft and individually engaged with the pair of gears; and

15

engagement radii or speed reduction ratios of engagements between the pair of individual gears and the individual driving gears are different from each other.

F-8196

Identifier: Masao TERAOKA

26. (Withdrawn) A torque transmission coupling according to claim 25, wherein the compression gear disposed between the gears set comprises a cam mechanism that causes the thrust to be generated by enforcing the relative rotation.

5 27. (Withdrawn) A torque transmission coupling according to claim 25, wherein:

one of the gears is supported in a support body side in the direction along the rotation axis;

the other of the gears opposes the side of the friction engagement member;

and

10 the engagement is performed by moving the other gear toward the friction engagement member according to the thrust and supporting the one of the pair of the gears in the support body side.

28. (Withdrawn) A torque transmission coupling according to claim 26, wherein:

15 one of the gears is supported in a support body side in the direction along the rotation axis;

the other of the gears opposes the side of the friction engagement member;

and

F-8196

Identifier: Masao TERAOKA

the engagement is performed by moving the other gear toward the friction engagement member according to the thrust and supporting the one of the pair of the gears in the support body side.

5 29. (Withdrawn) A torque transmission coupling according to claim 25, wherein:

at least one of the pair of gears and the pair of driving gears is formed of face gears; and

the engagement radii of the pair of gears and the driving gears are different from each other.

10 30. (Withdrawn) A torque transmission coupling according to claim 26, wherein:

at least one of the pair of gears and the pair of driving gears is formed of face gears; and

15 the engagement radii of the pair of gears and the driving gears are different from each other.

31. (Withdrawn) A torque transmission coupling according to claim 27, wherein:

F-8196

Identifier: Masao TERAOKA

at least one of the pair of gears and the pair of driving gears is formed of face gears; and

the engagement radii of the pair of gears and the driving gears are different from each other.

5 32. (Withdrawn) A torque transmission coupling according to claim 25, wherein:

the pair of gears and the pair of driving gears are formed of crossed gears or bevel gears; and

10 speed reduction ratios of the pair of gears and the driving gears are different from each other.

33. (Withdrawn) A torque transmission coupling according to claim 26, wherein:

the pair of gears and the pair of driving gears are formed of crossed gears or bevel gears; and

15 speed reduction ratios of the pair of gears and the driving gears are different from each other.

34. (Withdrawn) A torque transmission coupling according to claim 27, wherein:

F-8196

Identifier: Masao TERAOKA

the pair of gears and the pair of driving gears are formed of crossed gears or bevel gears; and

speed reduction ratios of the pair of gears and the driving gears are different from each other.

5 35. (Withdrawn) A torque transmission coupling according to claim 25, wherein:

one of the input-output rotary members is a clutch housing, and the other thereof is a clutch hub disposed on an inner circumference side of the clutch housing;

10 the friction engagement member is provided between the clutch housing and the clutch housing;

an compression member opposing the friction engagement member in the direction along the rotation axis is disposed in an end portion between the clutch housing and the clutch hub; and

15 the compression member is compressed by the thrust of the compression gear set.

36. (Withdrawn) A torque transmission coupling according to claim 26, wherein:

F-8196

Identifier: Masao TERAOKA

one of the input-output rotary members is a clutch housing, and the other thereof is a clutch hub disposed on an inner circumference side of the clutch housing;

5 the friction engagement member is provided between the clutch housing and the clutch housing;

an compression member opposing the friction engagement member in the direction along the rotation axis is disposed in an end portion between the clutch housing and the clutch hub; and

10 the compression member is compressed by the thrust of the compression gear set.

37. (Withdrawn) A torque transmission coupling according to claim 27, wherein:

15 one of the input-output rotary members is a clutch housing, and the other thereof is a clutch hub disposed on an inner circumference side of the clutch housing;

the friction engagement member is provided between the clutch housing and the clutch housing;

20 an compression member opposing the friction engagement member in the direction along the rotation axis is disposed in an end portion between the clutch housing and the clutch hub; and

F-8196

Identificr: Masao TERAOKA

the compression member is compressed by the thrust of the compression gear set.

38. (Withdrawn) A torque transmission coupling according to claim 29, wherein:

5 one of the input-output rotary members is a clutch housing, and the other thereof is a clutch hub disposed on an inner circumference side of the clutch housing;

the friction engagement member is provided between the clutch housing and the clutch housing;

10 an compression member opposing the friction engagement member in the direction along the rotation axis is disposed in an end portion between the clutch housing and the clutch hub; and

the compression member is compressed by the thrust of the compression gear set.

15 39. (Withdrawn) A torque transmission coupling according to claim 32, wherein:

one of the input-output rotary members is a clutch housing, and the other thereof is a clutch hub disposed on an inner circumference side of the clutch housing;

F-8196

Identifier: Masao TERAOKA

the friction engagement member is provided between the clutch housing and the clutch housing;

an compression member opposing the friction engagement member in the direction along the rotation axis is disposed in an end portion between the clutch housing and the clutch hub; and

the compression member is compressed by the thrust of the compression gear set.

40. (Withdrawn) A torque transmission coupling according to claim 33, wherein:

one of the input-output rotary members is a clutch housing, and the other thereof is a clutch hub disposed on an inner circumference side of the clutch housing;

the friction engagement member is provided between the clutch housing and the clutch housing;

an compression member opposing the friction engagement member in the direction along the rotation axis is disposed in an end portion between the clutch housing and the clutch hub; and

the compression member is compressed by the thrust of the compression gear set.

F-8196

Identifier: Masao TERAOKA

41. (Withdrawn) A torque transmission coupling according to claim 34,
wherein:

one of the input-output rotary members is a clutch housing, and the other
thereof is a clutch hub disposed on an inner circumference side of the clutch
5 housing;

the friction engagement member is provided between the clutch housing and
the clutch housing;

an compression member opposing the friction engagement member in the
direction along the rotation axis is disposed in an end portion between the clutch
10 housing and the clutch hub; and

the compression member is compressed by the thrust of the compression
gear set.

42. (Cancelled)

43. (Original) A torque transmission coupling according to claim 2,
15 whercin the torque transmission coupling is disposed to any one of an output side
of a transfer device, an input side to a rear differential, a propeller shaft between
the transfer device and the rear differential, a front-wheel side acceleration shaft,
and rear-wheel side acceleration shaft of a four-wheel drive vehicle.

F-8196

Identifier: Masao TERAOKA

44. (Currently Amended) The coupling of claim 45 further comprising:
an exterior housing;
a pinion shaft rotatably connected with the input rotary member;
the pinion shaft being rotatably supported within the housing by a pair of
5 axially spaced bearings; and
center axes of each bearing and said pinion shaft being mutually angularly
offset.

45. (New) A torque transmission coupling comprising:
input-output rotary members rotatably supported to perform input-output
10 transmission of torque;
a frictional engagement section provided between the input-output rotary
members to perform torque transmission between the input-output rotary members
by enforcing frictional engagement;
a compression member set that comprises a pair of members capable of
15 performing relative rotation and that generates thrust through the relative rotation
between the members to thereby cause the frictional engagement section to perform
the frictional engagement; and
a rotary actuator that causes both of the members of the compression
member set to perform engagement-rotational driving whereby to cause the relative
20 rotation;

F-8196

Identifier: Masao TERAOKA

the compression member set is a compression gear set that comprises a pair of gears provided as the pair of members, an outer gear engaged with the gears and an outer gear support for supporting the outer gear, and that converts an input generated by rotational driving into a compression force in the direction along a rotation axis of the compression member set to thereby cause the frictional engagement section to enforce the frictional engagement, wherein gear ratios or engagement radii between the pair of individual gears and the outer gear are different from each other; any one of the pair of gears, the outer gear, and the outer gear support is non-rotatably supported; any other one thereof is rotationally driven; and the other thereof performs the relative rotation;

the rotary actuator performs the rotational driving; and

the pair of gears comprise a proximal gear and a distal gear;

the distal gear being disposed further from the rotary actuator than the proximal gear; and

the proximal gear being disposed radially inward of said outer gear;

the coupling further comprising an exterior housing and the outer gear support being supported to be capable of performing constant-angle relative rotation and capable of revolving relative to the exterior housing about the rotation axis of the compression member set;

an urging member to be interposed between the outer gear support and a support body side being provided to interfere to rotation with an urging force for

F-8196

Identifier: Masao TERAOKA

the outer gear support that rotates in the same direction at a time of the rotational driving by the rotary actuator;

the torque transmission coupling further comprising displacement detection means that detects a displacement amount when the outer gear support performs rotational displacement in resistance with the urging member; and

an engagement force of the frictional engagement section being obtained in accordance with the displacement amount detected;

the outer gear support comprises:

first and second radially extending plates disposed on axially opposing ends of the outer gear;

a pin connecting the plates and supporting the outer gear;

one of the plates including a cutout, the cutout having a first end disposed between an inner and outer radius of the plate and the cutout extending tangentially from the first end; and

the urging member being a biasing member that engages the plate cutout.

46. (New) A torque transmission coupling comprising:

input-output rotary members rotatably supported to perform input-output transmission of torque;

F-8196

Identifier: Masao TERAOKA

a frictional engagement section provided between the input-output rotary members to perform torque transmission between the input-output rotary members by enforcing frictional engagement;

5 a compression member set that comprises a pair of members capable of performing relative rotation and that generates thrust through the relative rotation between the members to thereby cause the frictional engagement section to perform the frictional engagement; and

10 a rotary actuator that causes both of the members of the compression member set to perform engagement-rotational driving whereby to cause the relative rotation;

the compression member set is a compression gear set that comprises a pair of gears provided as the pair of members, an outer gear engaged with the gears and outer gear support for supporting the outer gear, and that converts an input generated by rotational driving into a compression force in the direction along a rotation axis of the compression member to thereby cause the frictional engagement section to enforce the frictional engagement, wherein gear ratios or engagement radii between the pair of individual gears and the outer gear are different from each other; any one of the pair of gears, the outer gear, and the outer gear support is non-rotatably supported; any other one thereof is rotationally driven; and the other

15

20 thereof performs the relative rotation;

the rotary actuator performs the rotational driving; and

F-8196

Identifier: Masao TERAOKA

the pair of gears comprise a proximal gear and a distal gear;

the distal gear being disposed further from the rotary actuator than the proximal gear; and

5 a press member provided between the frictional engagement section and the compression member set, receiving the thrust from the compression member set to cause the frictional engagement;

wherein the coupling further comprises a support boss section circumferentially provided on an inner circumference of the press member so as to be extended toward the distal gear;

10 the distal gear is supported relatively rotatable around an outer circumferential surface of the support boss section.

47. (New) A torque transmission coupling comprising;

input-output rotary members rotatably supported to perform input-output transmission of torque;

15 a frictional engagement section provided between the input-output rotary members to perform torque transmission between the input-output rotary members by enforcing frictional engagement;

a compression member set that comprises a pair of members capable of performing relative rotation and that generates thrust through the relative rotation

F-8196

Identifier: Masao TERAOKA

between the members to thereby cause the frictional engagement section to perform the frictional engagement; and

5 a rotary actuator that causes both of the members of the compression member set to perform engagement-rotational driving whereby to cause the relative rotation;

the compression member set is a compression gear set that comprises a pair of gears provided as the pair of members, an outer gear engaged with the gears and an outer gear support for supporting the outer gear, and that converts an input generated by rotational driving into a compression force in the direction along a rotation axis of the compression member to thereby cause the frictional engagement section to enforce the frictional engagement, wherein gear ratios or engagement radii between the pair of individual gears and the outer gear are different from each other; any one of the pair of gears, the outer gear, and the outer gear support is non-rotatably supported; any other one thereof is rotationally driven; and the other thereof performs the relative rotation;

10

15

the rotary actuator performs the rotational driving; and

the pair of gears comprise a proximal gear and a distal gear;

the distal gear being disposed further from the rotary actuator than the proximal gear;

20 wherein the rotary actuator comprises an electric motor and an output shaft that is divided from and supports the proximal gear;

F-8196

Identifier: Masao TERAOKA

the output shaft is supported to an exterior housing by bearings which are disposed in both sides of the electric motor in the direction along the rotational axis;

5 one end of the output shaft disposed in the compression member set side is extended toward the compression member set so as to protrudes from one bearing disposed in the compression member set side in the direction along the rotational axis,

the proximal gear is detachably connected to the one end of the output shaft.